WHAT IS CLAIMED IS:

1. A method for producing a biologically active agent from a prodrug, comprising:
   a. encapsulating a first cell-free reaction center in a biocompatible matrix; and
   b. administering said biocompatible matrix to a subject;

wherein said biocompatible matrix comprises an inorganic-based sol-gel matrix and wherein said first reaction center converts a first prodrug into a first biologically active agent in said subject.

2. The method of claim 1, wherein said biocompatible matrix comprises a silica-based sol-gel matrix.

3. The method of claim 2, wherein said first reaction center comprises one of the following: an enzyme, an antibody or a catalytic antibody.

4. The method of claim 2, wherein said biocompatible matrix encapsulates at least one additive.

5. The method of claim 2, wherein said first reaction center comprises L-amino acid decarboxylase.

6. The method of claim 5, wherein said first prodrug comprises L-dopa and said first biologically active agent comprises dopamine.

7. The method of claim 2, wherein said first reaction center comprises L-tyrosine decarboxylase.

8. The method of claim 7, wherein said first prodrug comprises L-dopa and said first biologically active agent comprises dopamine.

9. The method of claim 2, further comprising encapsulating a second reaction center in said biocompatible matrix before administering said biocompatible matrix to said subject.

10. The method of claim 9, wherein said first biologically active agent produced by said first reaction center from said first prodrug is a second prodrug for said second reaction center, and wherein said second reaction center produces a second biologically active agent that differs from said first biologically active agent.

11. The method of claim 12, wherein said first reaction center comprises tyrosine monooxygenase, and said second reaction center is one of the following: L-amino acid decarboxylase or L-tyrosine decarboxylase.

12. The method of claim 11, wherein said first prodrug comprises tyrosine, said first biologically active agent and said second prodrug comprises L-dopa, and said second biologically active agent comprises dopamine.

13. The method of claims 4, 5, 6, 7, 8, 11 or 12, wherein administering said biocompatible matrix comprises administering said biocompatible matrix to a region of the brain of said subject.

14. The method of claim 13, wherein said region of said brain of said subject is one of the following: basal ganglia, substantia nigra or striatum.

15. The method of claim 2, wherein said biocompatible matrix is prepared from at least one type of oxysilane.

16. The method of claim 15, wherein said biocompatible matrix is prepared from more than one type of oxysilane.

17. The method of claim 15, wherein said biocompatible matrix is prepared from at least one type of inorganic oxide and at least one type of oxysilane.

18. The method of claim 15 or 16, wherein said type of oxysilane has at least one non-hydrolizable substituent.

19. The method of claim 2, wherein said biocompatible matrix consists essentially of siloxane.

20. The method of claim 2, wherein said biocompatible matrix comprises siloxane.

21. The method of claim 2, wherein administering said biocompatible matrix comprises surgical implantation.

22. The method of claim 2, further comprising administering said first prodrug to said subject.

23. The method of claim 2, wherein said first prodrug comprises an exogenous prodrug.

24. The method of claim 2, wherein said first prodrug comprises an endogenous prodrug.

25. The method of claim 2, wherein said first reaction center comprises an enzyme or antibody that is xenogeneic to said subject.

26. The method of claim 3, wherein the ratio of K_m (nonencapsulated) to K_m (encapsulated) for said first reaction center is greater than or equal to one.

27. The method of claim 3, wherein the ratio of K_m (nonencapsulated) to K_m (encapsulated) for said first reaction center is less than or equal to one.

28. The method of claim 2, wherein said first reaction center comprises more than one weight percent of said biocompatible matrix.

29. The method of claim 2, wherein said first reaction center comprises less than one weight percent of said biocompatible matrix.

30. The method of claim 29, wherein said first reaction center comprises more than five weight percent of said biocompatible matrix.

31. The method of claim 31, wherein said first reaction center comprises more than ten weight percent of said biocompatible matrix.

32. The method of claim 2, wherein said first reaction center is attached to said biocompatible matrix.

33. The method of claim 2, wherein said biocompatible matrix is immunoisolatory.

34. The method of claim 2, wherein administering said biocompatible matrix comprises parenteral administration.

35. The method of claim 2, wherein administering said biocompatible matrix comprises systemic administration.

36. The method of claim 2, wherein treatment of said subject by said method results in long-term, stable production of said first biologically active agent in said subject.

37. The method of claim 22, wherein said first prodrug is administered to said subject on at least more than one occasion.

38. The method of claim 2, wherein said first biologically active agent is cytotoxic.

39. The method of claim 38, wherein said biocompatible matrix is implanted in proximity to a neoplasm.

40. The method of claim 2, wherein said first reaction center does not leach significantly from said biocompatible matrix.

41. The method of claim 2, wherein said biocompatible matrix comprises a xero-gel.

42. The method of claim 15, wherein said oxysilane is one of the following: TMOS or TEOS.

43. The method of claim 3, wherein said biocompatible matrix causes prodrug activation.

44. The method of claim 2, wherein said first prodrug is a deleterious agent to said subject and said first biologically active agent is less deleterious to said subject than said first prodrug.

45. The method of claim 44, wherein said first prodrug is an agent to which said subject is capable of becoming addicted, and wherein said subject is less capable of becoming addicted to said first biologically active agent.

46. The method of claim 45, wherein said first prodrug is one of the following: ethanol or cocaine.

47. The method of claim 2, wherein said first prodrug is one of the following: L-phenylalanine, noradrenalin, norepinephrine, histadine, histamine, 1-methylhistamine, glutumate, GABA or serine.

48. The method of claim 2, wherein said subject is human.

49. The method of claim 2, wherein said subject receives a therapeutically effective amount of said biocompatible matrix and said first prodrug.

50. The method of claim 23, wherein the ratio of the therapeutic index of treatment using said first prodrug and said biocompatible matrix over the therapeutic index of treatment using said first prodrug alone is about five or more.

51. The method of claim 50, wherein the ratio of the therapeutic index of treatment using said first prodrug and said biocompatible matrix over the therapeutic index of treatment using said first prodrug alone is about ten or more.

52. The method of claim 51, wherein the ratio of the therapeutic index of treatment using said first prodrug and said biocompatible matrix over the therapeutic index of treatment using said first prodrug alone is at least about one hundred.

53. The method of claim 37, wherein the ratio of the therapeutic index of treatment using said first prodrug and said biocompatible matrix over the therapeutic index of treatment using the biologically active agent of said first prodrug alone is at about five or more.

54. The method of claim 53, wherein the ratio of the therapeutic index of treatment using said first prodrug and said biocompatible matrix over the therapeutic index of treatment using the biologically active agent of said first prodrug alone is at about ten or more.

55. The method of claim 51, wherein the ratio of the therapeutic index of treatment using said first prodrug and said biocompatible matrix over the therapeutic index of treatment using the biologically active agent of said first prodrug alone is at least about one hundred.

56. The method of claim 2, wherein said first biologically active agent comprises a neutrophic factor.

57. The method of claim 2, wherein said first biologically active agent comprises a type selected from the group consisting of anti-angiogenesis factors, antiinfectives; antibiotics agents; antiviral agents; analgesics; anorexics; antihelmintics; antiarthritics; antiasthmatic agents; anticonvulsants; antidepressants; antidiuretic agents; antidiarrheals; antihistamines; antiinflammatory agents; antimigraine preparations; antinauseants; antineoplastics; antiparkinsonism drugs; antipruritics; antipsychotics; antipyretics, antispasmodics; anticholinergics; sympathomimetics; xanthine derivatives; cardiovascular preparations; calcium channel blockers; beta-blockers; antiarrhythmics; antihypertensives; catecholamines; diuretics; vasodilators; central nervous system stimulants; cough preparations; cold preparations; decongestants; growth factors, hormones; steroids,; corticosteroids; hypnotics; immunosuppressives; muscle relaxants; parasympatholytics; psychostimulants; sedatives; tranquilizers; proteins; polysaccharides; glycoproteins; lipoproteins; interferons; cytokines; chemotherapeutic agents; anti-neoplastics, antibiotics, anti-virals, anti-fungals, anti-inflammatories, anticoagulants, lymphokines, and antigenic materials.

58. The method of claim 3, wherein said first reaction center comprises an enzyme that is a member of a class selected from the group consisting of oxidoreductases; transferases; hydrolases; isomerases; and ligases.

59. The method of claim 2, wherein said first reaction center replaces, augments or supplements some endogenous biological activity in said subject.

60. The method of claim 59, wherein said first reaction center comprises an enzyme in which said subject is deficient.

61. The method of claim 60, wherein said first reaction center is one of the following: glucocerebrosidase; α-1,4 - glucosidase; α-galactosidase; α-L-iduronidase; β-glucuronidase; aminolaevulinate dehydratase; bilirubin oxidase; catalase; fibrinolysin; glutaminase; hemoglobin; heparinase; L-arginine ureahydrolase (A1); arginase; liver microsomal enzymes; phenylalanine ammonia lyase; streptokinase; superoxide dismutase; terrilythin; tyrosinase; UDP glucuronyl transferase; urea cycle enzymes; urease; uricase; or urokinase.

62. A method of toxicology testing, comprising:
    a. encapsulating at least one reaction center in a silica-based sol-gel matrix;
    b. interacting a compound with said matrix; and,
    c. evaluating for any products of said compound resulting from conversion of said compound by said reaction center,

wherein production of any cytotoxic or mutagenic products indicates that said compound may be toxic to a subject upon administration.

63. The method of claim 62, wherein said reaction center comprises an enzyme that is located in the liver of a mammal.

64. The method of claim 62, wherein said reaction center is an enzyme prepared by recombinant methods.

65. The method of claim 62, wherein said reaction center is cell-free.

66. The method of claim 63, wherein said mammal is one of the following: a pig or a human.

67. A biocompatible matrix for treatment, comprising:

a. a inorganic-based sol-gel matrix that is biocompatible; and,

b. a first cell-free reaction center encapsulated in said matrix,

wherein said first reaction center, after administration of said matrix to a subject, produces a therapeutically effective amount of a first biologically active agent from a first prodrug in said subject.

68. The biocompatible matrix of claim 67, wherein said biocompatible matrix comprises a silica-based sol-gel matrix.

69. The biocompatible matrix of claim 67, wherein said first reaction center comprises one of the following: an enzyme, an antibody or a catalytic antibody.

70. The biocompatible matrix of claim 68, wherein said first reaction center comprises one of the following: L-amino acid decarboxylase or L-tyrosine decarboxylase.

71. The biocompatible matrix of claim 71, wherein said first reaction center comprises L-amino acid decarboxylase, said first prodrug comprises L-dopa, and said first biologically active agent comprises dopamine.

72. The biocompatible matrix of claim 68, wherein said biocompatible matrix further comprises a second reaction center.

73. The biocompatible matrix of claim 72, wherein said first biologically active agent produced by said first reaction center from said first prodrug is a second prodrug for said second reaction center, and wherein said second reaction center produces a second biologically active agent that differs from said first biologically active agent.

74. The biocompatible matrix of claim 73, wherein said first reaction center comprises tyrosine monooxygenase, and said second reaction center is one of the following: L-amino-acid decarboxylase or L-tyrosine decarboxylase.

75. The biocompatible matrix of claims 70, 71 or 74, wherein administering said biocompatible matrix comprises administering said biocompatible matrix to a region of the brain of said subject.

76. The biocompatible matrix of claim 75, wherein said region of said brain of said subject is one of the following: basal ganglia, substantia nigra or striatum.

77. The biocompatible matrix of claim 68, wherein said biocompatible matrix is prepared from at least one type of oxysilane.

78. The biocompatible matrix of claim 68, wherein said biocompatible matrix is siloxane.

79. The biocompatible matrix of claim 77, wherein said type of oxysilane has at least one non-hydrolizable substituent.

80. The biocompatible matrix of claim 68, wherein said first prodrug is exogenous to said subject.

81. The biocompatible matrix of claim 67, wherein said first prodrug is endogenous to said subject.

82. The biocompatible matrix of claim 68, wherein said first reaction center comprises an enzyme that is xenogeneic to said subject.

83. The biocompatible matrix of claim 69, wherein the ratio of K_m (nonencapsulated) to K_m (encapsulated) for said first reaction center is greater than or equal to one.

84. The biocompatible matrix of claim 67, wherein said first reaction center comprises more than one weight percent of said biocompatible matrix.

85. The biocompatible matrix of claim 82, wherein said xenogeneic enzyme comprises more than five weight percent of said biocompatible matrix.

86. The biocompatible matrix of claim 68, wherein said first reaction center comprises more than ten weight percent of said biocompatible matrix.

87. The biocompatible matrix of claim 68, wherein said biocompatible matrix is immunoisolatory.

88. The biocompatible matrix of claim 68, wherein said biocompatible matrix is capable of long-term, stable production of said first biologically active agent in said subject.

89. The biocompatible matrix of claim 69, wherein said first biologically active agent is cytotoxic.

90. The biocompatible matrix of claim 67, wherein said first reaction center does not leach significantly from said biocompatible matrix after administration.

91. The biocompatible matrix of claim 68, wherein said biocompatible matrix comprises a xero-gel.

92. The biocompatible matrix of claim 77, wherein said oxysilane is one of the following: TMOS or TEOS.

93. The biocompatible matrix of claim 68, wherein said first prodrug is a deleterious agent to said subject and said first biologically active agent is less deleterious to said subject than said first prodrug..

94. The biocompatible matrix of claim 67, wherein said first prodrug is an agent to which said subject is capable of becoming addicted, and wherein said subject is less capable of becoming addicted to said first biologically active agent.

95. The biocompatible matrix of claim 68, wherein said first prodrug is one of the following: L-phenylalanine, noradrenalin, norepinephrine, histadine, histamine, 1-methylhistamine, glutumate, GABA or serine.

96. The biocompatible matrix of claim 80, wherein the ratio of the therapeutic index of treatment using said first prodrug and said first biocompatible matrix over the therapeutic index of treatment using said first prodrug alone is about five or more.

97. The biocompatible matrix of claim 88, wherein the ratio of the therapeutic index of treatment using said first prodrug and said first biocompatible matrix over the therapeutic index of treatment using said first prodrug alone is at least about one hundred.

98. The biocompatible matrix of claim 80, wherein the ratio of the therapeutic index of treatment using said first prodrug and said biocompatible matrix over the therapeutic index of treatment using the biologically active agent of said first prodrug alone is at least about ten or more.

99. The biocompatible matrix of claim 80, wherein said first biologically active agent comprises a type selected from the group consisting of anti-angiogenesis factors, antiinfectives; antibiotics agents; antiviral agents; analgesics; anorexics; antihelmintics; antiarthritics; antiasthmatic agents; anticonvulsants; antidepressants; antidiuretic agents; antidiarrheals; antihistamines; antiinflammatory agents; antimigraine preparations; antinauseants; antineoplastics; antiparkinsonism drugs; antipruritics; antipsychotics; antipyretics, antispasmodics; anticholinergics; sympathomimetics; xanthine derivatives; cardiovascular preparations; calcium channel blockers; beta-blockers; antiarrhythmics; antihypertensives; catecholamines; diuretics; vasodilators; central nervous system stimulants; cough preparations; cold preparations; decongestants; growth factors, hormones; steroids,; corticosteroids; hypnotics; immunosuppressives; muscle relaxants; parasympatholytics; psychostimulants; sedatives; tranquilizers; proteins; polysaccharides; glycoproteins; lipoproteins; interferons; cytokines; chemotherapeutic agents; anti-neoplastics, antibiotics, anti-virals, anti-fungals, anti-inflammatories, anticoagulants, lymphokines, and antigenic materials.

100. The biocompatible matrix of claim 68, wherein said first reaction center comprises an enzyme that is member of a class of one of the following: oxidoreductases; transferases; hydrolases; isomerases; or ligases.

101. The biocompatible matrix of claim 67, wherein said first reaction center replaces, augments or supplements some endogenous biological activity in said subject.

102. The biocompatible matrix of claim 68, wherein said first reaction center comprises an enzyme in which said subject is deficient.

103. The biocompatible matrix of claim 102, wherein said first reaction center is one of the following: glucocerebrosidase; α-1,4 - glucosidase; α-galactosidase; α-L-iduronidase; β-glucuronidase; aminolaevulinate dehydratase; bilirubin oxidase; catalase; fibrinolysin; glutaminase; hemoglobin; heparinase; L-arginine ureahydrolase (A1); arginase; liver microsomal enzymes; phenylalanine ammonia lyase; streptokinase; superoxide dismutase; terrilythin; tyrosinase; UDP glucuronyl transferase; urea cycle enzymes; urease; uricase; or urokinase.

104. A biologically active agent produced by a process comprising:
   a. encapsulating a first cell-free reaction center in a biocompatible matrix; and
   b. administering said biocompatible matrix to a subject;

wherein said biocompatible matrix comprises an inorganic-based sol-gel matrix, and wherein said biologically active agent is produced by said first reaction center from a first prodrug in said subject.

105. The biologically active agent of claim 104, wherein said biocompatible matrix comprises a silica-based sol-gel matrix.

106. The biologically active agent of claim 105, wherein said first reaction center comprises one of the following: an enzyme, an antibody or a catalytic antibody.

107. The biologically active agent of claim 106, wherein said first reaction center is one of the following: L-amino acid decarboxylase, L-tyrosine decarboxylase or tyrosine monooxygenase,

108. The biologically active agent of claim 105, further comprising encapsulating a second reaction center in said biocompatible matrix before administering said biocompatible matrix to said subject.

109. The biologically active agent of claim 107, wherein administering said biocompatible matrix comprises administering said biocompatible matrix to one of the following regions of the brain: basal ganglia, substantia nigra or striatum.

110. The biologically active agent of claim 105, further comprising preparing said biocompatible matrix from at least one type of oxysilane at substantially the same time as said encapsulating of said first reaction center.

111. The biologically active agent of claim 105, wherein said biocompatible matrix consists essentially of siloxane.

112. The biologically active agent of claim 105, wherein administering said biocompatible matrix to a subject comprises surgical implantation.

113. The biologically active agent of claim 110, further comprising administering said first prodrug to said subject.

114. The biologically active agent of claim 105, wherein said first prodrug comprises a prodrug exogenus to said subject.

115. The biologically active agent of claim 105, wherein said process results in long-term, stable production of said biologically active agent in said subject.

116. The biologically active agent of claim 114, wherein said first prodrug is administered to said subject on at least more than one occasion.

117. The biologically active agent of claim 105, wherein said first prodrug is a deleterious agent to said subject and said first biologically active agent is less deleterious to said subject than said first prodrug..

118. The biologically active agent of claim 105, wherein said subject is human.

119. The biologically active agent of claim 105, wherein said biologically active agent comprises a type selected from the group consisting of anti-angiogenesis factors, antiinfectives; antibiotics agents; antiviral agents; analgesics; anorexics; antihelmintics; antiarthritics; antiasthmatic agents; anticonvulsants; antidepressants; antidiuretic agents; antidiarrheals; antihistamines; antiinflammatory agents; antimigraine preparations; antinauseants; antineoplastics; antiparkinsonism drugs; antipruritics; antipsychotics; antipyretics, antispasmodics; anticholinergics; sympathomimetics; xanthine derivatives; cardiovascular preparations; calcium channel blockers; beta-blockers; antiarrhythmics; antihypertensives; catecholamines; diuretics; vasodilators; central nervous system stimulants; cough preparations; cold preparations; decongestants; growth factors, hormones; steroids,; corticosteroids; hypnotics; immunosuppressives; muscle relaxants; parasympatholytics; psychostimulants; sedatives; tranquilizers; proteins; polysaccharides; glycoproteins; lipoproteins; interferons; cytokines; chemotherapeutic agents; anti-neoplastics, antibiotics, anti-virals, anti-fungals, anti-inflammatories, anticoagulants, lymphokines, and antigenic materials.

120. The biologically active agent of claim 105, wherein said first reaction center comprises an enzyme that is member of a class selected from the group consisting of oxidoreductases; transferases; hydrolases; isomerases; and ligases.

121. The biologically active agent of claim 111, wherein said first reaction center comprises an enzyme in which said subject is deficient.

122. A tissue assist device, comprising:

a. a inorganic-based sol-gel matrix that is biocompatible; and,

b. a first reaction center encapsulated in said matrix,

wherein upon placing said biocompatible matrix in contact with fluids of a subject, said first reaction center converts a first prodrug into a first biologically active agent, and wherein said first reaction center provides a biological function characteristic of tissue of said subject.

123. The device of claim 122, wherein said biocompatible matrix comprises a silica-based sol-gel matrix.

124. The device of claim 123, wherein said tissue is an organ.

125. The device of claim 124, wherein said organ is a liver.

126. The device of claim 125, wherein said first reaction center is one of the following: cytochrome P-450, hepatocytes or Kupffer cells.

127. The device of claim 124, wherein said first prodrug is endogenous to said subject and is more deleterious to said subject than said first biologically active agent.

128. The device of claim 123, wherein said fluid is blood of said subject.

129. The device of claim 125, wherein said first reaction center is xenogeneic.

130. The device of claim 123, wherein said contact occurs extracorporeal to said subject.

131. The device of claim 123, wherein said tissue of said subject is deficient in converting said first prodrug into said first biologically active agent.

132. A kit for treatment of a subject, comprising:

a. a-inorganic-based sol-gel matrix that is biocompatible; and,

b. a first cell-free reaction center encapsulated in said matrix,

wherein said first reaction center, after administration of said matrix to a subject, produces a therapeutically effective amount of a first biologically active agent from a first prodrug in said subject.

133. The kit of claim 132, wherein said biocompatible matrix comprises a silica-based sol-gel matrix.

134. The kit of claim 133, further comprising instructions for treatment of said subject using said kit.

135. The kit of claim 133, further comprising one or more doses of said first prodrug for administration to said subject.

136. The kit of claim 135, wherein said dose of said first prodrug is formulated for controlled release of said first prodrug upon administration to said subject.

137. A method of treatment of a subject, comprising:

a. a step for encapsulating a first cell-free reaction center in a biocompatible matrix; and

b. a step for administering said biocompatible matrix to a subject;

wherein said biocompatible matrix comprises a silica-based sol-gel matrix, and wherein said first reaction center converts a first prodrug into a first biologically active agent in said subject.

138. The method of treatment of claim 137, further comprising a step for administering said prodrug to said subject before, at the same time or after said step for administering said biocompatible matrix to said subject.